

CLAIMS

What is claimed is:

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1. A vascular graft comprising:
a core zone comprising a PET fabric, said core zone configured for use in a vessel having an internal diameter of more than 2 mm, said core zone having a first surface and a second surface opposing said first surface; and
a first non-porous coating disposed on at least said first surface, wherein said first coating comprises at least one polyurethane.
 2. The graft of claim 1 wherein said core zone comprises woven or knitted PET.
 3. The graft of claim 1 wherein said first surface is a blood interface surface.
 4. The graft of claim 1 wherein said first surface is an artery or tissue interface surface.
 5. The graft of claim 1 wherein at least a portion of said core zone has a substantially cylindrical shape.
 6. The graft of claim 5 wherein the core zone has an internal diameter of more than 6 mm.
 7. The graft of claim 5 wherein said first surface is disposed on the inner surface of said cylindrical core zone.
 8. The graft of claim 5 wherein said first surface is disposed on the outer surface of said cylindrical core zone.
 9. The graft of claim 1 wherein said graft further comprises a second coating disposed on said second surface.
 10. The graft of claim 9 wherein polyurethane applied to said first surface to form said first coating penetrates said core zone and forms said second coating on said second surface.
 11. The graft of claim 1 wherein said graft comprises an AAA stent graft.
 12. The graft of claim 1 wherein said graft is a vascular graft, a stent-graft or a vascular patch.
 13. The graft of claim 1 wherein the coating comprises a polyurethane urea.
 14. The graft of claim 1 wherein the coating comprises a polyetherurethane urea blended with a siloxane containing a surface modifying additive.
 15. The graft of claim 1 wherein the coating comprises Thoralon®.
 16. The graft of claim 1 wherein said at least one polyurethane comprises a soft segment and a hard segment.

17. The graft of claim 16 wherein the soft segment has a molecular weight of about 2,000 g/mole.

18. The graft of claim 16 wherein the soft segment comprises one or more compounds selected from the group consisting of polyethylene oxide, polypropylene oxide, polytetramethylene oxide, polycarbonate, polyolefin, polysiloxane, polyether soft segments made from higher homologous series of diols, and mixtures and combinations thereof.

19. The graft of claim 16 wherein the hard segment comprises one or more compounds selected from the group consisting of 4,4'-diphenylmethane diisocyanate, tetramethylene diisocyanate, hexamethylene diisocyanate, trimethyhexamethylene diisocyanate, tetramethylxylylene diisocyanate, 4,4'-decyclohexylmethane diisocyanate, dimer acid diisocyanate, isophorone diisocyanate, metaxylene diisocyanate, diethylbenzene diisocyanate, decamethylene 1,10 diisocyanate, cyclohexylene 1,2-diisocyanate, 2,4-toluene diisocyanate, 2,6-toluene diisocyanate, xylene diisocyanate, m-phenylene diisocyanate, hexahydrotolylene diisocyanate (and isomers), naphthylene-1,5-diisocyanate, 1-methoxyphenyl 2,4-diisocyanate, 4,4'-biphenylene diisocyanate, 3,3-dimethoxy-4,4'-biphenyl diisocyanate, ethylene diamine, propane diamines, butanediamines, hexanediamines, pentane diamines, heptane diamines, octane diamines, m-xylylene diamine, 1,4-cyclohexane diamine, 2-methypentamethylene diamine, 4,4'-methylene dianiline, alkanol amines and diamines, ethylene glycol, diethylene glycol, triethylene glycol, 1,4-butanediol, neopentyl alcohol, 1,6-hexanediol, 1,8-octanediol, propylene glycols, 2,3-butylene glycol, dipropylene glycol, dibutylene glycol, glycerol, and mixtures and combinations thereof.

20. The graft of claim 16 wherein said coating comprises a polyether urethane urea, and wherein said soft segment comprises polytetramethylene oxide (PTMO) and said hard segment comprises 4,4'-diphenylmethane diisocyanate (MDI) and ethylene diamine.

21. A method for sealing the pores of a porous PET graft comprising the step of:

coating at least one surface of said graft with a polymer composition to produce a pore-free coat on said surface, said polymer composition comprising at least one polyurethane, said polyurethanes comprising a soft segment and a hard segment, said graft configured for use in a vessel having an internal diameter of more than 2 mm.

22. The method of claim 21 wherein said graft comprises an AAA stent graft.

23. The method of claim 21 wherein said polymer composition comprises Thoralon®.

24. The method of claim 21 wherein said soft segment comprises one or more compounds selected from the group consisting of polyethylene oxide, polypropylene oxide, polytetramethylene oxide, polycarbonate, polyolefin, polysiloxane, polyether soft segments made from higher homologous series of diols, and mixtures and combinations thereof.

25. The method of claim 21 wherein said hard segment comprises one or more compounds selected from the group consisting of 4,4'-diphenylmethane diisocyanate, tetramethylene diisocyanate, hexamethylene diisocyanate, trimethyhexamethylene diisocyanate, tetramethylxylene diisocyanate, 4,4'-decyclohexylmethane diisocyanate, dimer acid diisocyanate, isophorone diisocyanate, metaxylene diisocyanate, diethylbenzene diisocyanate, decamethylene 1,10 diisocyanate, cyclohexylene 1,2-diisocyanate, 2,4-toluene diisocyanate, 2,6-toluene diisocyanate, xylene diisocyanate, m-phenylene diisocyanate, hexahydrotolylene diisocyanate (and isomers), naphthylene-1,5-diisocyanate, 1-methoxyphenyl 2,4-diisocyanate, 4,4'-biphenylene diisocyanate, 3,3-dimethoxy-4,4'-biphenyl diisocyanate, ethylene diamine, propane diamines, butanediamines, hexanediamines, pentane diamines, heptane diamines, octane diamines, m-xylylene diamine, 1,4-cyclohexane diamine, 2-methypentamethylene diamine, 4,4'-methylene dianiline, alkanol amines and diamines, ethylene glycol, diethylene glycol, triethylene glycol, 1,4-butanediol, neopentyl alcohol, 1,6-hexanediol, 1,8-octanediol, propylene glycols, 2,3-butylene glycol, dipropylene glycol, dibutylene glycol, glycerol, and mixtures and combinations thereof.

26. A method for making a vascular prosthesis comprising:

providing a core zone comprising a PET fabric, said core zone configured for use in a vessel having an internal diameter of more than 2 mm, said core zone having a first surface and a second surface opposing said first surface; and

coating at least the first surface of the core zone with a polymer composition to produce a first pore-free coat on said first surface, said polymer composition comprising at least one polyurethane, said polyurethanes comprising a soft segment and a hard segment.

27. The method of claim 26 wherein the step of coating comprises:

spraying at least one layer of the polymer composition on the first surface of the core zone; and

allowing said layer to dry.

28. The method of claim 27 wherein said step of allowing said layer to dry comprises heating said layer to between about 30°C to about 150°C.

29. The method of claim 27 wherein said step of allowing said layer to dry comprises heating said layer to about 60°C.

30. The method of claim 26 wherein the step of coating comprises applying said polymer composition to said first surface with a brush or roller.

31. The method of claim 30 further comprising heating the coated surface to drive off any solvent.

32. The method of claim 31 wherein said coated surface is heated to between about 30 °C to about 150°C.

33. The method of claim 31 wherein said coated surface is heated to about 60°C.

34. The method of claim 26 further comprising coating the second surface with said polymer composition.

35. The method of claim 26 wherein the step of coating comprises dipping the core zone in a slurry or solution of said polymer composition.

36. The method of claim 26 wherein the step of coating comprises coating at least the first surface with a monomer and polymerizing the monomer to form the polymer composition by thermal or high energy light.

37. The method of claim 26 wherein said graft comprises an AAA stent graft.

38. The method of claim 26 wherein said polymer composition comprises Thoralon®.

39. The method of claim 26 wherein said soft segment comprises one or more compounds selected from the group consisting of polyethylene oxide, polypropylene oxide, polytetramethylene oxide, polycarbonate, polyolefin, polysiloxane, polyether soft segments made from higher homologous series of diols, and mixtures and combinations thereof.

40. The method of claim 26 wherein said hard segment comprises one or more compounds selected from the group consisting of 4,4'-diphenylmethane diisocyanate, tetramethylene diisocyanate, hexamethylene diisocyanate, trimethyhexamethylene diisocyanate, tetramethylxylylene diisocyanate, 4,4'-decyclohexylmethane diisocyanate, dimer acid diisocyanate, isophorone diisocyanate, metaxylene diisocyanate, diethylbenzene diisocyanate, decamethylene 1,10 diisocyanate, cyclohexylene 1,2-diisocyanate, 2,4-toluene diisocyanate, 2,6-toluene diisocyanate, xylene diisocyanate, m-phenylene diisocyanate, hexahydroxytoluylene

diisocyanate (and isomers), naphthylene-1,5-diisocyanate, 1-methoxyphenyl 2,4-diisocyanate, 4,4'-biphenylene diisocyanate, 3,3-dimethoxy-4,4'-biphenyl diisocyanate, ethylene diamine, propane diamines, butanediamines, hexanediamines, pentane diamines, heptane diamines, octane diamines, m-xylylene diamine, 1,4-cyclohexane diamine, 2-methypentamethylene diamine, 4,4'-methylene dianiline, alkanol amines and diamines, ethylene glycol, diethylene glycol, triethylene glycol, 1,4-butanediol, neopentyl alcohol, 1,6-hexanediol, 1,8-octanediol, propylene glycols, 2,3-butylene glycol, dipropylene glycol, dibutylene glycol, glycerol, and mixtures and combinations thereof.

41. The method of claim 26 further comprising pretreating the core zone by washing in methylene chloride.

42. The method of claim 26 wherein the polymer composition further comprises one or more additives to enhance bonding of the polymer composition to the core zone.

43. The method of claim 26 wherein the step of coating further comprises allowing the polymer composition to penetrate the core zone to produce a second coat on said second surface.

44. The method of claim 26 wherein the polymer composition comprises a polyurethane modified with a cationic, anionic or aliphatic side chain.

45. The method of claim 26 wherein the polymer composition comprises a heat or UV polymerizable polymer.

46. A method for repairing a defective vessel in an individual, said vessel having an internal diameter of more than 2 mm, comprising:

reinforcing or replacing said defective vessel with a vascular graft comprising a PET fabric core zone and a polyurethane coating disposed on at least one surface of said core zone.

47. The method of claim 46 wherein said individual is a mammal.

48. The method of claim 46 wherein said individual is a human.

49. The method of claim 46 wherein said defective vessel is an abdominal aorta.